REMARKS

Reconsideration of this application as amended is requested. By this amendment Applicants have amended claims 5, 7 and 9 to correct obvious typographical errors and omissions. Claims 1-10 remain in the case.

The Examiner maintains the rejection of claims 1-10 under 35 U.S.C. 103(a) as being unpatentable over Jungerman et al (U.S. Patent No. 7,206,340 – "Jungerman") in view of Soma et al (U.S. Patent No. 6,775,321 – "Soma"). In response to Applicants' prior arguments the Examiner insists that the prior art combination, via the teachings and suggestions of Soma, disclose "filtering said frequency domain data by multiplying said frequency domain data by respective predetermined coefficients in different frequency domains." Applicants continue to respectfully traverse this nonobvious combination suggested by the Examiner, having the benefit of hindsight.

Applicants' claimed invention is an apparatus and method for clock signal recovery and jitter measurement relative to the recovered clock signal using an uncomplicated algorithm with few calculations. Rather than processing all of the acquired data representing received, external clock and data signals (as in the prior art), the present invention detects clock edges of the external clock in the time domain, which edge data is then converted to the frequency domain and filtered, the filtering simulating a phase lock loop. The resultant filtered frequency domain data is then converted back to the time domain to obtain the edges of the recovered clock, i.e., to generate the recovered clock. To measure jitter, the time domain data for the edges of the external clock are compared with the time domain data for the edges of the recovered clock. Likewise the time domain data of the external data signal may be compared with the time domain data of the recovered clock to obtain jitter for the external data signal.

In contradistinction to Applicants' claimed invention, Jungerman discloses a method and system for characterizing a random component of jitter by designating an edge in a repetitive pattern, determining a slope of the designated edge and acquiring a set of amplitude values at different occurrences of the designated edge. Since Jungerman uses an equivalent-time sampler, the input signal to a device under test (DUT) is the repetitive pattern from a pattern generator or communication line. No such "repetitive pattern" limitation exists in Applicants' claimed invention. Input to the sampler of Jungerman, together with the output data signal from the DUT, is a pattern trigger from the pattern generator, or a recovered clock from the pattern signal or an external clock from which the pattern trigger is derived. There is no indication of the method that Jungerman uses to recover the clock signal in order to derive the pattern trigger, so one of ordinary skill in the art can only assume that one of the conventional means discussed by Applicants is used. The sampler controls an adjustable delay for the pattern trigger to control the timing of sample acquisitions. The acquired samples are processed by designating an edge (rising or falling) from among the edges within the repetitive pattern and adjusting the delay so that the samples are timed to occur on the designated edge, i.e., a set of amplitude samples are acquired each repetition of the pattern around the designated edge. The sets of amplitude samples are converted to the frequency domain, and peaks that occur are truncated. The resulting truncated frequency domain data is converted back to the time domain and an RMS value is determined. From the RMS value and the slope of the designated edge, a corresponding RMS time jitter is determined. This is a complicated algorithm for determining jitter, and does not involve simulating a phase lock loop or recovering a clock from an external clock related to the

pattern signal for comparison with the external clock or pattern signal.

Soma discloses another apparatus and method of measuring jitter of a clock signal, such as Applicants' external clock signal, by estimating an instantaneous phase of the clock and obtaining a difference between the instantaneous phase and a linear phase at a zero-crossing point. From these values a timing jitter, a period jitter and cycle-to-cycle period jitter of the clock signal is calculated. The only time domain to frequency domain to time domain conversion used by Soma is in the analytic transformation module to determine instantaneous phase of the clock signal by forming real and imaginary parts of the clock signal -- a complex clock signal. There is no indication of first detecting edges in the time domain, converting the edge data to the frequency domain and filtering to simulate a phase lock loop, and then converting the filtered data back to the time domain. Soma merely converts the clock signal to a complex signal in order to determine instantaneous phase of the clock signal.

Contrary to the Examiner's convoluted argument, all Soma teaches to one of ordinary skill in the art is that the repetitive pattern signal of Jungerman, if a clock signal, may be converted to a complex analytic signal using a time-frequency-time conversion technique that zeros some frequency components. Then clock jitter may be determined based on instantaneous phase versus linear phase. But Jungerman does not have a technique that uses instantaneous phase of the external signal in order to determine jitter, and does not have a technique for handling a complex input signal. Further there is no clock recovery taught by Soma or Jungerman (other than for deriving the pattern trigger), and no combination of Soma with Jungerman suggests that clock recovery is achieved by detecting edges of an external clock, converting the edge data to the frequency domain, filtering in the frequency domain to simulate a phase lock loop, and then converting the filtered data to the time domain to recover edge data for the recovered clock. At best Jungerman detects sets of samples about a designated edge in a repetitive pattern, not clock edge data generally, and such samples occur (if combined with Soma) after the time-frequency-time conversion analytic transformation of Soma. There is no teaching or suggestion in either reference that clock edge data be converted to the frequency domain and then filtered to simulate a phase lock loop, from which the recovered clock is derived back in the time domain. Thus claims 1-10 are deemed to be allowable as being nonobvious to one of ordinaryskill in the art over Jungerman in view of Soma.

In view of the foregoing amendment and remarks, allowance of claims 1-10 is urged, and such action and the issuance of this case are requested.

Respectfully submitted,

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Attorney Docket No. 7651-US0